

PATENT COOPERATION TREATY

APPLN. OF: LAFATA et al  
APPLN. NO: PCT/US00/26901  
FILED: SEPTEMBER 29, 2000  
FOR: METHOD AND APPARATUS FOR MOLDING PLASTIC ...  
DOCKET: TRM TR990031 PCT  
BOX PCT  
Assistant Commissioner for Patents  
Washington, D.C. 20231

ARTICLE 34 AMENDMENT

Dear Sir:

The present invention discloses the use of interchangeable gate design mold members which function to allow the adjustment of polymer flow fronts emanating from the gates in order that multiple colors (formulations) can be injection molded without surface defects yet not require major mold modifications between colors. Filled polymer compositions, particularly those containing various types of flat particles or flakes as colorants are popular today to create a unique appearance as well as to eliminate the need for painting. The rheological characteristics of these polymer compositions vary widely from color to color in automotive applications due to the physical nature of these colorants. However, it is not cost effective to have separate molds or even modify a mold to optimize the processing characteristics for each color. According to this invention, the entry points for polymer to the mold can be built to accommodate interchangeable mold members or gate inserts, which can either be open or closed or partially limit flow into a specific area of a mold, thus allowing polymer flow fronts to be adjusted. This results in less visible weld lines, swirls and flow patterns of the filled polymer such that products having acceptable surface appearance can be produced. In this manner, when a color change is accomplished on a molding machine, only minor changes in rapid fashion need be made to the mold (interchanging gate inserts).

Thus, the essence of the present invention is to provide interchangeable gate inserts primarily designed to service a single cavity mold, to allow the adjustment of polymer flow fronts to improve the aesthetics of metallic appearing plastic molded articles.

In U.S. Patent No. 4,828,769 to Maus, the objective is to adjust mold cavity volume (cavity enlargement system 104) via die inserts 5a and "resilient members" (springs or cylinders) 131. The die inserts comprise the mold cavity not the gate. Maus does disclose flow restrictive members, of which comprise a knob adjustable cam driven member which can be inserted into conventional gates 98 to impede polymer flow.

In column 29, lines 40-50 of 4,828,769 Maus notes "A simple example of such would be to use lift-out interchangeable gate sections at the flow entry point or gate of each cavity. Such means would have the disadvantage of requiring a great number of such machined interchangeable gate inserts in inventory, since a given configuration gives optimal results for only one combination of such differing Rx lenses. Therefore, most preferred means for thus correctively redistributing melt flow to the differing lenses cavities are as pictured. . ." The focus of Maus involves balancing the volume and mass flow to multiple different (volume, shape) cavities to yield acceptable discs or lenses.

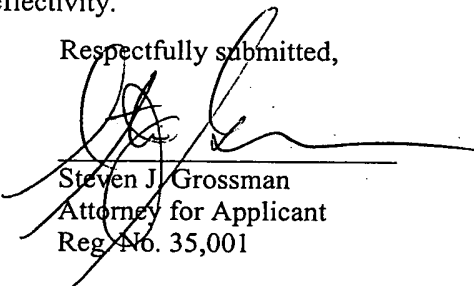
Thus, Maus recites the use of interchangeable die inserts and adjustable flow restrictive members to balance mass and volume differences in multicavity tooling. The present invention discloses the use of interchangeable gate inserts in primarily single cavity tooling to adjust polymer flow fronts to minimize aesthetic (surface) defects (i.e. modify light reflectivity of the pigment additive).

Hepler in U.S. Patent No. 5,334,006 discloses a heated sprue bushing having an interchangeable tip with a plurality of the edge gates for "controlling the temperature of the plasticized material as it is conveyed through the stationary plate or plates of an injection mold from the nozzle to the cavity gate(s)." (Col. 2, lines 42-

45). Again the focus here is on multicavity applications (column 10, line 9). The sprue bushing is intended to be part of the injection portion of the molding machine, not part of the mold.

Amended claims 1-25 are attached hereto on replacement pages 8-10, which emphasize the feature of interchangeable gate design in molded plastic articles having pigments used to modify light reflectivity.

Respectfully submitted,

  
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cb/dr/clm

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